

PATENT

Attorney Docket No. 9792909-5787

REMARKS

Claims 1-4 and 6-9 have been amended, claim 5 has been canceled, and claims 10-16 have been added herein. Upon entry of this amendment, claims 1-4 and 6-16 will be pending in the above-identified application.

Specification

The specification has been amended to include reference to U.S. Patent No. 6,176,747 as recommended by the Examiner. Accordingly, Applicant requests the objection be withdrawn.

Claims 7-9 - 35 U.S.C. § 112

Applicant respectfully requests reconsideration of the rejection of claims 7-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7-9 have been amended for clarification and to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Accordingly, the rejection is improper and Applicant requests the rejection be withdrawn.

Claims 1-4 - 35 U.S.C. § 102

Applicant respectfully requests reconsideration of the rejection of claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,409,319 (Colacino) as evidenced by U.S. Patent No. 4,702,792.

Claims 1-4 recite a method of manufacturing a semiconductor apparatus comprising, among other things, forming a first mask material film on a film to be processed, and forming a vertical aperture pattern in the film to be processed.

Colacino does not disclose or suggest forming a vertical aperture pattern in a film to be processed. Rather, Colacino discloses a resist mask process wherein apertures formed by RIE etching in layers 4 and 10 are sloped. Because Colacino does not disclose every element recited in the claims, the Section 102 rejection of claims 1-4 is improper and should be withdrawn.

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Claims 6, 8, and 9 - 35 U.S.C. § 102

Applicant respectfully requests reconsideration of the rejection of claims 6, 8 and 9 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,816,115 (Horner).

Claim 6 recites a method of manufacturing a semiconductor apparatus comprising, among other things, providing a film to be processed on a substrate, providing a resist film on at least one dielectric mask material film, wherein the dielectric mask material film is disposed on the film, and using the resist film as a mask and etching the dielectric mask material film to form an open pattern, wherein the open pattern is formed with tapered sides such that a bottom of the open pattern is narrower than an aperture side of the open pattern, and wherein the bottom of the open pattern is formed at a desirable micro dimension exceeding capabilities of lithography techniques.

Horner does not disclose or suggest providing a film to be processed on a substrate, providing a resist film on at least one dielectric mask material film disposed on the film, and using the resist film as a mask and etching the dielectric mask material film to form an open pattern, wherein the open pattern is formed with tapered sides such that a bottom of the open pattern is narrower than an aperture side of the open pattern, and wherein the bottom of the open pattern is formed at a desirable micro dimension exceeding capabilities of lithography techniques. Rather, Horner discloses a process of making via holes wherein a pattern of holes are formed in a polyimide layer 8 that is disposed on an insulation layer 7, and a vertical aperture pattern is formed in the insulation layer by double dry etching using the pattern of holes formed in the polyimide layer. Because the vertical aperture pattern is formed by double dry etching, a dimension of a bottom of the holes in the polyimide layer 8 does not exceed capabilities of lithography techniques. Accordingly, because Horner does not disclose every element recited in the claim, the Section 102 rejection of claim 6 is improper and should be withdrawn.

Claim 8 recites a method of manufacturing a semiconductor apparatus comprising, among other things, forming a first mask material film on a film to be processed, and forming a tapered aperture pattern in which a bottom of the aperture pattern is made narrower than an open side of the aperture pattern on the first mask

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material film, wherein the bottom of the tapered aperture pattern is formed at a desirable micro dimension exceeding capabilities of lithography techniques.

As discussed above, Horner does not disclose or suggest a bottom of a tapered aperture pattern formed at a desirable micro dimension exceeding capabilities of lithography techniques. Accordingly, because Horner does not disclose every element recited in the claim, the Section 102 rejection of claim 6 is improper and should be withdrawn.

Claim 9 recites a method of reducing a contact hole diameter in a semiconductor apparatus comprising, among other things, providing a film to be processed on a substrate, disposing at least one dielectric mask material film on the film, providing a resist film on the dielectric mask material film, and using the resist film as a mask and etching the dielectric mask material film to form an open pattern, wherein the open pattern is formed with tapered sides such that a bottom of the open pattern is narrower than an aperture side of the open pattern, and wherein the bottom of the open pattern is formed at a desirable micro dimension exceeding capabilities of lithography techniques.

As discussed above, Horner does not disclose or suggest a bottom of an open pattern formed at a desirable micro dimension exceeding capabilities of lithography techniques. Because Horner does not disclose every element recited in the claim, the Section 102 rejection of claim 9 is improper and should be withdrawn.

Claim 7 - 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claim 7 under 35 U.S.C. § 103 as being unpatentable over Horner in further view of U.S. Patent No. 5,981,913 (Kadomura).

Claim 7 recites a method of manufacturing a semiconductor apparatus comprising, among other things, forming a first mask material film on a film to be processed, and forming a tapered aperture pattern in which a bottom of the aperture pattern is made narrower than an open side of the aperture pattern on the first mask material film, wherein the bottom of the tapered aperture pattern is formed at a desirable micro dimension exceeding capabilities of lithography techniques.

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As discussed above, Horner does not disclose or suggest a bottom of a tapered aperture pattern formed at a desirable micro dimension exceeding capabilities of lithography techniques. Kadomura also fails to disclose or suggest this limitation of claim 7. Because Horner and Kadomura individually fail to disclose or suggest this limitation of claim 7, the combination of these references also fails to disclose or suggest this limitation of claim 7. Accordingly, the Section 103 rejection of claim 7 is improper and should be withdrawn.

Conclusion

As it is believed that the application is in condition for allowance, favorable action and a Notice of Allowance are respectfully requested.

Respectfully submitted,

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